

# *Calcarmyobia* from the Oriental and Australasian regions (Acarina, Myobiidae)\*

Kimito Uchikawa

Department of Parasitology, Shinshu University School of Medicine, Matsumoto 390, Japan

## Introduction

Through examination of the *Miniopterus* bats deposited in the big museums in Europe and the United States, it is learned that mites of the genus *Calcarmyobia* specific to the genus *Miniopterus* have accomplished more advanced speciation in the Oriental and Australasian regions than in the Ethiopian region, and that all the species of mites from the Oriental and Australasian regions have in common some morphological properties that are different from those shared by the species from the Ethiopian region. The present paper deals with the description and records of mites from Oriental and Australasian *Miniopterus*.

Three species of these mites, *C. miniopterus* (Womersley), *C. hamata* Uchikawa *et al.* and *C. australasiae* Fain and Lukoschus, have so far been described from *Miniopterus* in the Oriental and Australasian regions. Twelve new taxa, inclusive of the six new subspecies, are found in the present study, and the number of species and subspecies of *Calcarmyobia* from these regions is now fifteen. As the records of *C. miniopterus* were already presented in the preceding paper (Uchikawa, 1985a), the other 14 taxa will be described below.

All the specimens came from the bats deposited in collections of AMNH (American Museum of Natural History, New York), BALM (Basel Museum of Natural History, Basel), BSPM (Bishop Museum, Honolulu), BMNH (British Museum (Natural History), London), FMNH (Field Museum of Natural History, Chicago), MNHM (Museum National d'Histoire Naturelle, Paris), ROM (Royal Ontario Museum, Toronto), SMF (Forschungs-Institut Senkenberg, Frankfurt) and USNM (US National Museum, Washington), and they all will be returned to the acarine collections in the respective museums.

The scales for all the figures are the same to those in Figs 1-6.

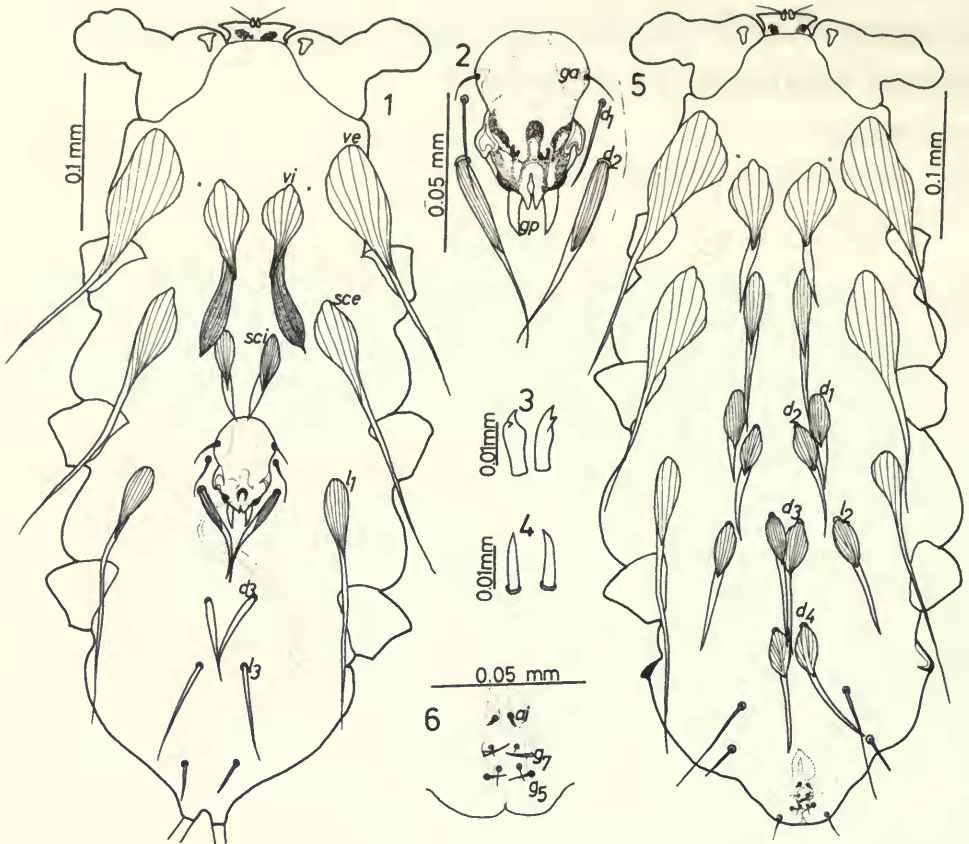
## *Calcarmyobia oriana oriana* sp. n., ssp. n.

**MALE** (Figs 1, 2, 3 & 4). Posterior part of setae *vi* inflated, finely striated and granulated. Setae *d*<sub>1</sub> very fine, only slightly thicker than *ga*. Genital shield lacking setae *gm* and with posterior lobes extending beyond basal level of *d*<sub>2</sub>; costal formation closer to base of *d*<sub>2</sub> than to base of *d*<sub>1</sub>; genital pore situated slightly posterior to basal level of *d*<sub>2</sub>; *gp* stout and pointed. Modified claw on leg II slightly thinner and shorter than normal one and forked. Modified seta on genu II as in Fig. 4; no inflated or thickened setae on tarsus II.

Measurements in  $\mu\text{m}$  for holotype and, in parentheses, for 5 paratypes and 4 other specimens: Body (= Gnathosoma + idiosoma) 460 (460-540) long by 210 (205-235) wide. Seta *ve* 165 (167-180) long; *vi* 115 (110-115) long; *sc e* 168 (170-200) long; *sc i* 60 (58-63) long; *d*<sub>1</sub> 30 (28-32) long; *d*<sub>2</sub> 63 (60-70) long; *d*<sub>3</sub> 55 (50-57) long; *l*<sub>1</sub> 168 (155-183) long; *l*<sub>3</sub> 83 (68-85) long. Genital shield 57 (58-63) long; distance between *ga*, *ga-ga* 34 (33-40). Modified setae on genu II 14-17 long.

**FEMALE** (Figs 5 & 6). Seta *d*<sub>1</sub> with tail almost the same in length to basal striate part; *d*<sub>3</sub> originating almost from or slightly anterior to basal level of *l*<sub>2</sub>, closer to each other than to *l*<sub>2</sub>. Basal striated part of *d*<sub>2</sub>-*d*<sub>4</sub> and *l*<sub>2</sub> rather long and spindle-shaped. Internal anal setae *ai* clavate. A pair of stout scales with blunt tips laterally on opisthosoma.

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**Figs 1–6** *Calcarmyobia oriana oriana* sp. n., ssp. n.: holotype male (1); genital shield of male (2); modified claw on leg II of male (3); modified seta on genu II of male (4); allotype female (5); genito-anal setae of female (6).

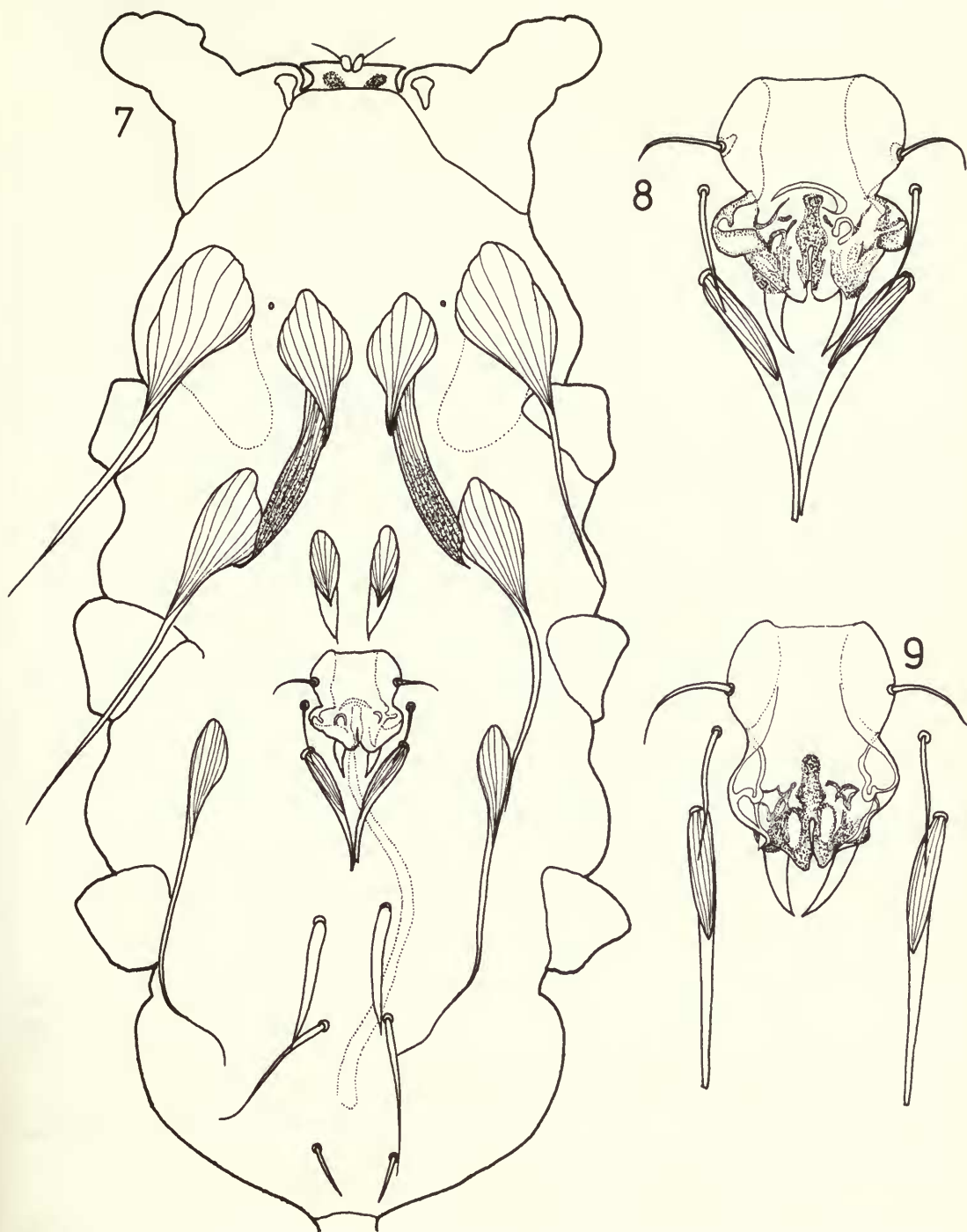
Measurements in  $\mu\text{m}$  for allotype and, in parentheses, for 5 other specimens. Body 545 (560–585) long by 240 (250–270) wide. Seta *ve* 173 (175–183); *vi* 104 (100–105); *sc e* 180 (188–198); *sc i* 110 (110–123); *d*<sub>1</sub> 68 (58–63); *d*<sub>2</sub> 75 (73–80); *d*<sub>3</sub> 92 (95–98); *d*<sub>4</sub> 85 (93–100); *l*<sub>1</sub> 180 (185–198); *l*<sub>2</sub> 90 (88–100); *d*<sub>1</sub>–*d*<sub>1</sub> 53 (55–62); *d*<sub>3</sub>–*d*<sub>3</sub> 16 (17–20); *d*<sub>3</sub>–*l*<sub>2</sub> 25 25–28).

**MATERIAL EXAMINED.** Holotype male, allotype female, 2 paratype males and a male ex *Miniopterus oriana*, Darwin, Australia, 9–IV–1948 (USNM 284209–34); 1♂ ex *M. oriana*, Wongabel, Queensland, Australia, 15–X–1946 (FMNH 60858); 1♂ ex *Miniopterus* (labelled *blepotis blepotis*), Chillagoe, Queensland, Australia, 7–I–1922 (FMNH 44245–7); 1♂ 2♀♀ ex *Miniopterus* (labelled *schreibersi*), Misima Is., Terr. Papua New Guinea, 8–VIII–1956 (AMNH 190473–8); 3♂♂ 3♀♀ ex *Miniopterus* (labelled *tibialis*), Finschhafen, Morobe Dist., Papua New Guinea, 22, 23–IX–1964 (AMNH 195333–45); 1♀ ex *Miniopterus* (labelled *magnater*), Kamu Valley, New Guinea, 18–VIII–1962 (BSPM 21608); 1♀ ex *Miniopterus* (labelled *magnater*), Morobe Dist., Papua New Guinea (BSPM 145440–3); 1♂ data uncertain (BSPS).

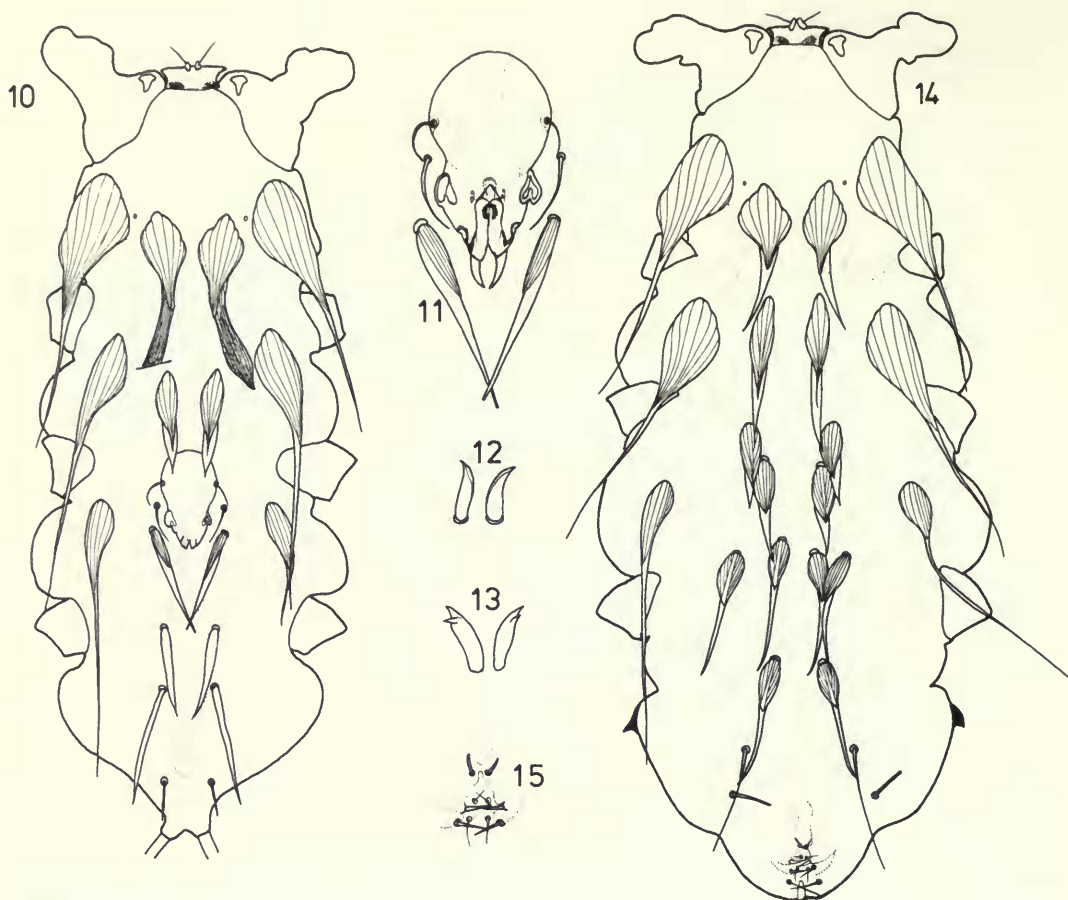
**REMARKS.** The present new species is characterized by the structure of the male genital shield as in Fig. 2. The female, on the other hand, shares many characteristics with those of other species.

The male shows a remarkable variation in size. The types measured 460  $\mu\text{m}$  in length (Fig. 1), while others reach a length of 540  $\mu\text{m}$ .

*Miniopterus oriana* is regarded as one of the true hosts of the mite, but the specific names of the bats listed above in parentheses are to be reconfirmed later.



Figs 7-9 *Calcarmyobia oriana eminens* ssp. n.: holotype male (7); genital shields of holotype (8) and paratype (9).



**Figs 10–15** *Calcarmyobia biloba* sp. n.: holotype male (10); genital shield of male (11); modified seta on genu II of male (12); modified claw on leg II of male (13); allotype female (14); genito-anal setae of female (15).

*Calcarmyobia orianae eminens* ssp. n.

**MALE** (Figs 7, 8 & 9). Genital shield with flat anterior margin and well developed costal formation; posterior part narrowed abruptly (Figs 8–9). Seta *vi* slightly longer than that of the nominate form; *sc i* short and with broad and short tail. Other structures essentially as in the nominate form.

Measurements in  $\mu\text{m}$  for holotype and a paratype. Body 535–510 long by 240–? wide. Seta *ve* 175–182; *vi* 130–125; *sc e* 178–195; *sc i* 55–57; *d*<sub>1</sub> ca. 30; *d*<sub>2</sub> 60–65; *d*<sub>3</sub> 55–50; *l*<sub>1</sub> 170–173; *l*<sub>3</sub> 78–65. Genital shield 57 long (paratype); *ga-ga* 35–38. Modified seta on genu II 17–15.

**FEMALE.** Unknown.

**MATERIAL EXAMINED.** Holotype male (1984.6.12.114) and a paratype male (1984.6.12.115) ex *Miniopterus* (labelled *schreibersi*), Peradeniya, Ceylon (BMNH 13.2.10.34–7).

**REMARKS.** *Calcarmyobia orianae eminens* ssp. n. is based only on the two male specimens. The genital shield, bearing the most important characteristics for separating species, is different in the holotype and paratype as depicted in Figs 8 and 9. On the supposition that the shield of the



holotype is deformed, the paratype is compared with the nominate form, and minor differences in the outline of the shield and the seta *sc i* of both forms is regarded as being of subspecies level.

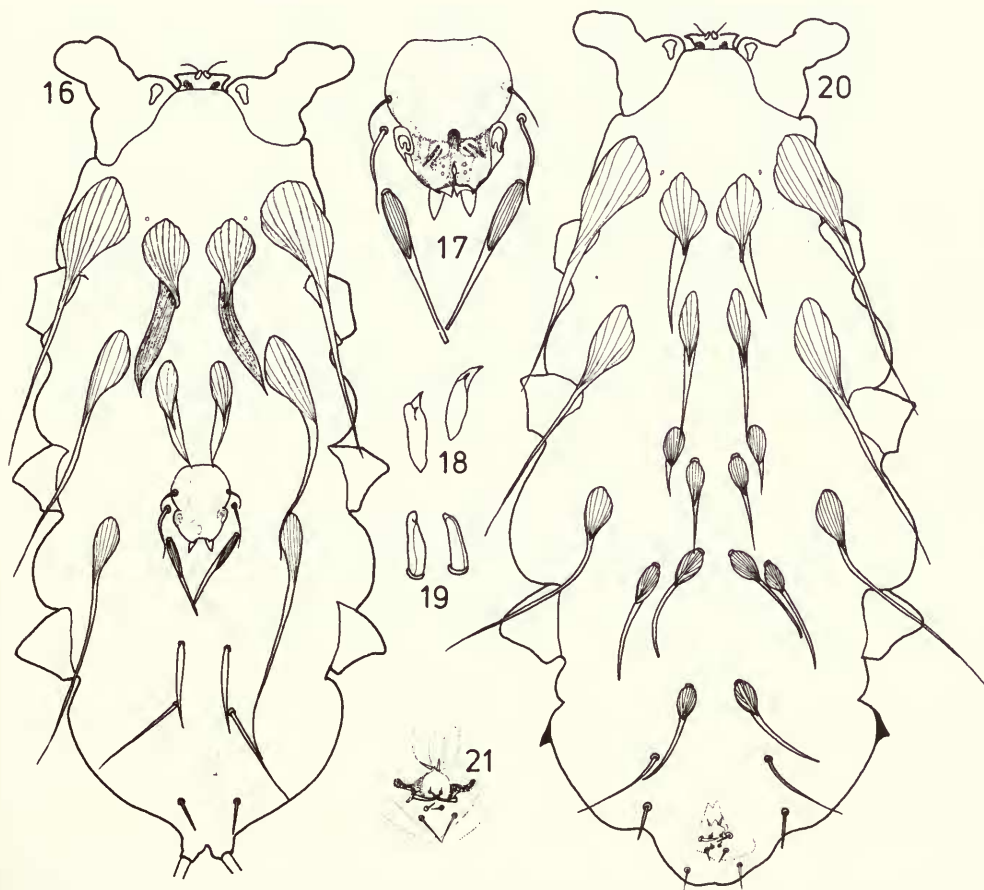
The host bats of the mite were from Ceylon, where *C. miniopteris* (Womersley) was also recorded (Uchikawa, 1985a).

*Calcarmyobia biloba* sp. n.

**MALE.** (Figs 10, 11, 12 & 13). Seta *vi* inflated, finely striated and granulated posteriorly. Seta *d*<sub>1</sub> fine; *d*<sub>2</sub> stout; *d*<sub>3</sub> inflated. Genital shield long and with 2 pairs of posterior lobes; anterior part oval; posterior part tapering; genital pore almost on basal level of *d*<sub>2</sub>; *gp* stout and pointed apically. Modified claw on leg II forked, slightly inferior in size to normal one. Modified seta on genu II peg-like.

Measurements in  $\mu\text{m}$  for holotype. Body 475 long by 200 wide. Seta *ve* 178; *vi* ca. 120; *sc e* 185; *sc i* 68; *d*<sub>1</sub> 28; *d*<sub>2</sub> 63; *d*<sub>3</sub> 52; *l*<sub>1</sub> 170; *l*<sub>3</sub> 80. Genital shield 62 long; *ga-ga* 35. Modified setae on genu II 15.

**FEMALE** (Figs 14 & 15). Seta *d*<sub>1</sub> with striated part 1.5 times as long as membranous tail; *d*<sub>3</sub> situated almost on or slightly anterior to basal level of *l*<sub>2</sub>; *d*<sub>3</sub> and *l*<sub>2</sub> spaced at almost the same intervals. Lateral scales on opisthosoma strong and pointed. Genital seta *g*<sub>7</sub> slightly thicker than *g*<sub>5</sub>; *ai* spiniform.



Figs 16–21 *Calcarmyobia brevis brevis* sp. n., ssp. n.: holotype male (16); genital shield of male (17); modified claw on leg II of male (18); modified seta on genu II (19); allotype female (20); genito-anal setae of female (21).

Measurements in  $\mu\text{m}$  for allotype and a paratype. Body 600–600 long by 265–260 wide. Seta *ve* 178–?; *vi* 105–108; *sc e* 192–178; *sc i* 120–115; *d*<sub>1</sub> 58–63; *d*<sub>2</sub> 78–78; *d*<sub>3</sub> 92–100; *d*<sub>4</sub> 90–95; *l*<sub>1</sub> 188–?; *l*<sub>3</sub> 90–95; *d*<sub>1</sub>–*d*<sub>1</sub> 60–60; *d*<sub>3</sub>–*d*<sub>3</sub> 23–23; *d*<sub>3</sub>–*l*<sub>3</sub> 25–25.

MATERIAL EXAMINED. Holotype male ex *Miniopterus macrocneme*, New Caledonia (BALM 1761, –63–6, Cotypes); allotype female and a paratype female ex *M. macrocneme*, New Caledonia, VII–XI–1944 (FMNH 55291–321).

REMARKS. *Calcarmyobia biloba* sp. n. is distinct in having the genital shield with 2 pairs of posterior lobes in the male. The female is, however, hardly separable from those that bear the lateral scales on the opisthosoma.

***Calcarmyobia brevis brevis* sp. n., ssp. n.**

MALE (Figs 16, 17, 18 & 19). Posterior part of seta *vi* inflated, finely striated and granulated. Seta *d*<sub>1</sub> fine and much smaller than *d*<sub>2</sub>. Genital shield short; posterior lobes terminating at basal level of *d*<sub>2</sub>; coastal formation closer to *d*<sub>1</sub> than to *d*<sub>2</sub>. Modified claw on leg II forked, slightly smaller in size than normal one. Modified seta on genu II stout and peg-like.

Measurements in  $\mu\text{m}$  for holotype and a paratype. Body 480–460 long by 215–210 wide. Seta *ve* 178–190; *vi* 115–113; *sc e* 163–160; *sc i* 65–63; *d*<sub>1</sub> 28–25; *d*<sub>2</sub> and *d*<sub>3</sub> 51–53 and 50–48, respectively; *l*<sub>1</sub> 153–150. Genital shield 50–48 long; *ga*–*ga* 35–38. Modified seta on genu II 15–15.

FEMALE (Figs 20 & 21). Seta *sc i* short and weak; basal striated part of *d*<sub>1</sub>–*d*<sub>4</sub> and *l*<sub>2</sub> short and bulbous; *l*<sub>1</sub> also inflated at base and narrowed abruptly; *d*<sub>3</sub> originating from distinctly anterior level of *l*<sub>2</sub> and slightly closer to each other than to *l*<sub>2</sub>. Setae in genito-anal region not prominent; *ai* spiniform. A pair of pointed scales laterally on opisthosoma.

Measurements in  $\mu\text{m}$  for allotype and, in parentheses, for two paratypes. Body 575 (570–560) long by 280 (275–270) wide. Seta *ve* 190 (185–ca.183); *vi* 100 (95–105); *sc e* 198 (200–210); *sc i* 103 (98–102); *d*<sub>1</sub> 50 (50–45); *d*<sub>2</sub> 68 (67–63); *d*<sub>3</sub> 83 (82–80); *d*<sub>4</sub> 80 (80–88); *l*<sub>1</sub> 185 (183–182); *l*<sub>2</sub> 85 (80–83); *d*<sub>1</sub>–*d*<sub>1</sub> 55 (52–53); *d*<sub>3</sub>–*d*<sub>3</sub> 25 (24–25); *d*<sub>3</sub>–*l*<sub>2</sub> 28 (25–26).

MATERIAL EXAMINED. Holotype male, allotype female, a paratype male and 2 paratype females ex *Miniopterus* (labelled *australis pusillus*), Hubili, Dharwar, Mysore, India, 3–I–1975 (SMF 47841).

REMARKS. *C. brevis brevis* sp. n., ssp. n. is distinct in having the genital shield with short posterior part in the male. Females of the genus *Calcarmyobia* usually reveal few specific morphological properties, but *C. brevis brevis* is remarkable for the bulbous formation of the striated part of the submedian setae dorsally on the hysterosoma and for a pair of pointed lateral scales on the opisthosoma.

***Calcarmyobia brevis grandis* ssp. n.**

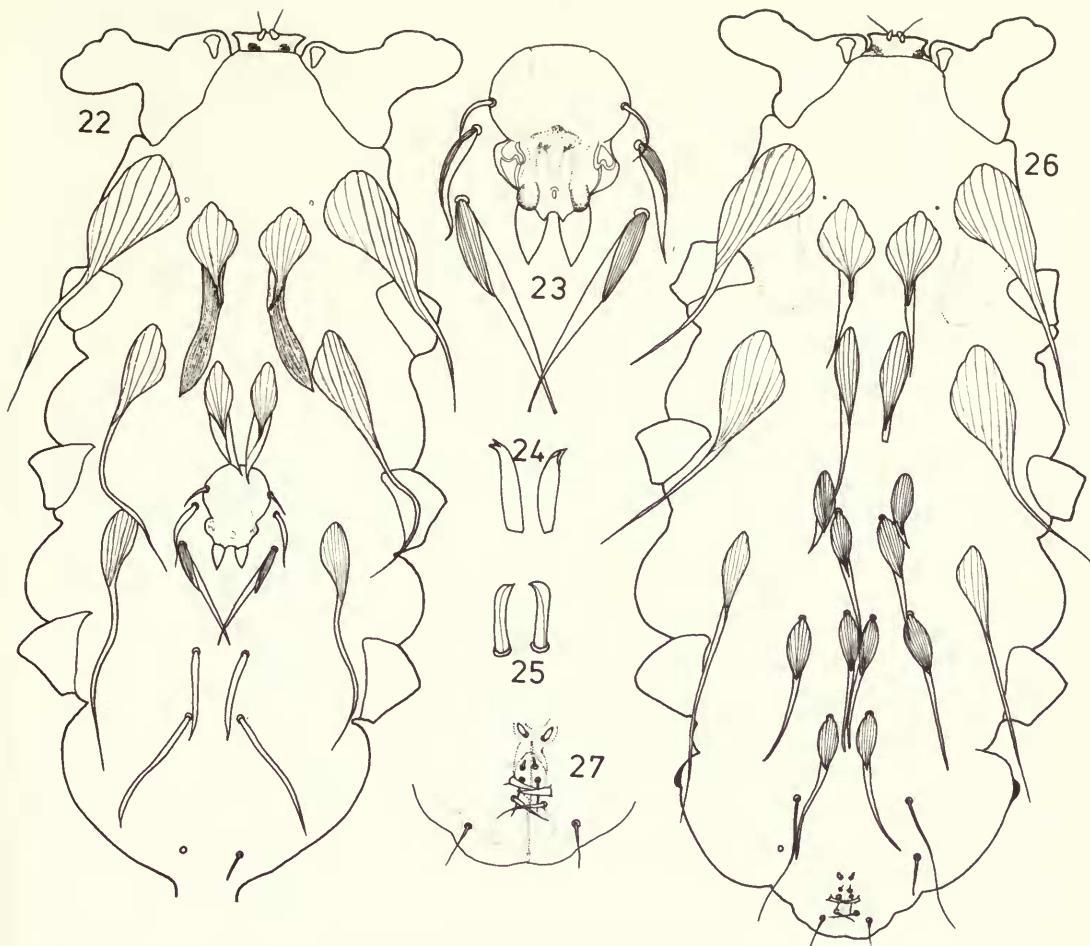
MALE (Figs 22, 23, 24 & 25). Setation, setal nature and structure of all parts essentially the same as in the nominate form, but measurements being larger. Setae *sc i*, *d*<sub>1</sub>, *d*<sub>2</sub>, *ga* and *gp* especially more prominent than corresponding setae of the nominate subspecies as shown in Figs 22 and 16.

Measurements in  $\mu\text{m}$  for holotype and, in parentheses, for three paratypes. Body 530 (530–540) long by 240 (235–250) wide. Seta *ve* 178 (175–180); *vi* 120 (128–130); *sc e* ca. 180 (170–170); *sc i* 78 (68–78); *d*<sub>1</sub> 45 (45–48); *d*<sub>2</sub> 70 (66–77); *d*<sub>3</sub> 58 (60–65); *l*<sub>1</sub> ? (170–180); *l*<sub>3</sub> 89 (85–85). Genital shield 55 (55–55) long; *ga*–*ga* 43 (40–43). Modified seta on genu II 18 (17–20) long.

FEMALE (Figs 26 & 27). Bases of seta *d*<sub>3</sub> almost on basal level of *l*<sub>2</sub>. Striated part of *d*<sub>1</sub>–*d*<sub>4</sub> and *l*<sub>1</sub> rather long and spindle-like. Anal seta *ai* clavate. Lateral scales on opisthosoma not pointed.

Measurements in  $\mu\text{m}$  for allotype. Body 610 long by 285 wide. Seta *ve* 183; *vi* 115; *sc e* ca. 200; *sc i* 123; *d*<sub>1</sub> 60; *d*<sub>2</sub> 83; *d*<sub>3</sub> 88; *d*<sub>4</sub>; 95; *l*<sub>1</sub> 195; *l*<sub>2</sub> 105; *d*<sub>1</sub>–*d*<sub>1</sub> 55; *d*<sub>3</sub>–*d*<sub>3</sub> 20; *l*<sub>2</sub>–*l*<sub>2</sub> 70.

MATERIAL EXAMINED. Holotype male ex *Miniopterus tristis tristis*, Philippines (ROM 43655); allotype female ex *M. tristis tristis*, Manjuroy Is., Philippines, 28–V–1966 (ROM 39860); 1♀ from the same host and locality as paratype female, 18–V–1966 (ROM 39668); 2 paratype males ex *M. tristis celebensis*, S. Sulawesi, 29–IX–1972 (AMNH 241557, type); a paratype male from *M. t. celebensis* with the same data as preceding ones (AMNH 241558).



**Figs 22–27** *Calcarmyobia brevis grandis* ssp. n.: holotype male (22); genital shield of male (23); modified claw on leg II of male (24); modified seta on genu II of male (25); allotype female (26); genito-anal setae of female (27).

*Calcarmyobia brevis intermedia* ssp. n.

**MALE** (Figs 28, 29, 30 & 31). Structure of genital shield and nature of setae on and flanking the shield almost the same as those of *C. brevis grandis*, but inferior in size to them.

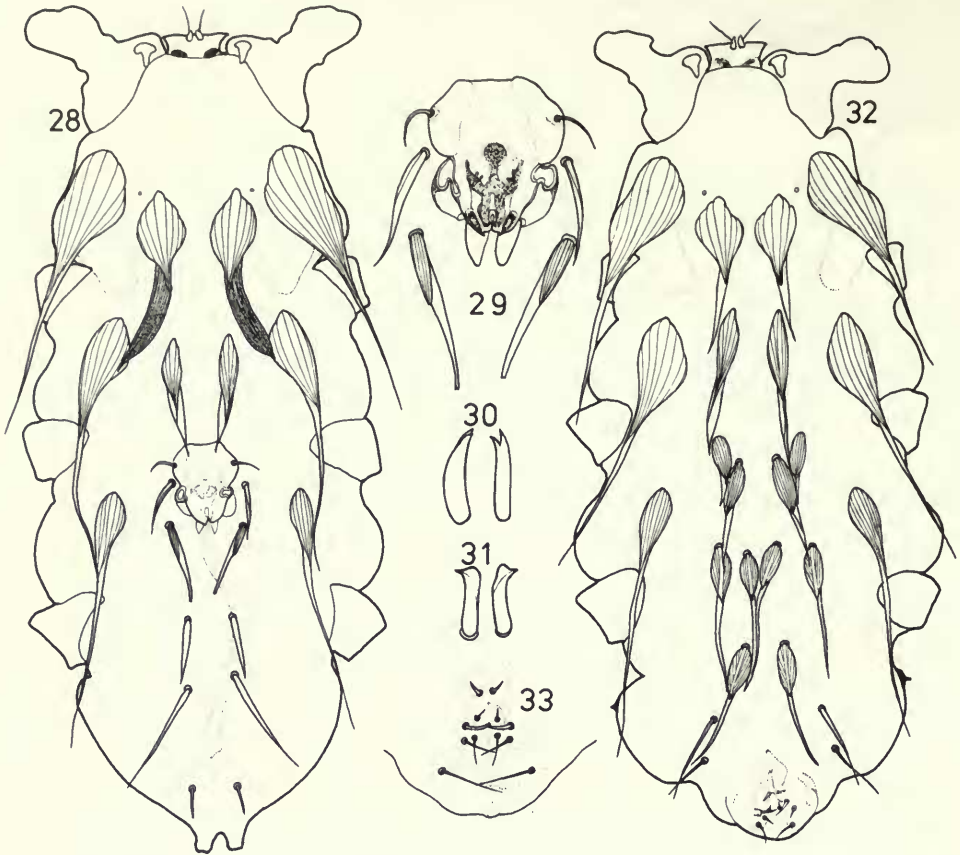
Measurements in  $\mu\text{m}$  for holotype and a paratype. Body 500–490 long by 220–230 wide. Seta *ve* 173–170; *vi* 118–120; *sc e* ?–170; *sc i* 70–73; *d*<sub>1</sub> 35–38; *d*<sub>2</sub> 52–62; *d*<sub>3</sub> 45–50; *l*<sub>1</sub> 153–160; *l*<sub>3</sub> 73–78. Genital shield 50–45 long; *ga*–*ga* 40–38. Modified seta on genu II 15–16.

**FEMALE** (Figs 32 & 33). Nature of submedian setae on hysterosoma almost the same to that of *C. brevis grandis*. Lateral scales on opisthosoma not so prominent. Genital seta *g*<sub>7</sub> narrow; *ai* setiform.

Measurements in  $\mu\text{m}$  for allotype and a paratype. Body 540–570 long by 260–250 wide. Seta *ve* 175–175; *d*<sub>2</sub> 75–175; *d*<sub>2</sub> 75–83; *d*<sub>3</sub> 100–95; *d*<sub>4</sub> 93–93; *l*<sub>1</sub> 183–180; *l*<sub>3</sub> 100–105; *d*<sub>1</sub>–*d*<sub>1</sub> 58–60; *d*<sub>3</sub>–*d*<sub>3</sub> 20–20; *l*<sub>2</sub>–*l*<sub>2</sub> 63–70.

**MATERIAL EXAMINED.** Holotype male, allotype female and a paratype male and female ex *Miniopterus eschscholtzii*, Mindanao, Philippines, 19–V–1952 (FMNH 80384–431); 1♂ ex *M. eschscholtzii*, Philippines (USNM 17906).





**Figs 28–33** *Calcarmyobia brevis intermedia* ssp. n.: holotype male (28); genital shield of male (29); modified claw on leg II of male (30); modified seta on genu II of male (31); allotype female (32); genito-anal setae of female (33).

**REMARKS.** *Calcarmyobia brevis grandis* ssp. n. and *C. brevis intermedia* ssp. n. are closer to each other than to the nominate form in having well developed  $d_1$ ,  $d_2$  and  $gp$  in the male. The basal striated part of the submedian setae dorsally on the hysterosoma of the female is bulbous in *C. brevis brevis* while it is spindle-like in both *C. brevis grandis* and *C. brevis intermedia*, suggesting a relative affinity among the three subspecies.

The above three subspecies are regarded as being suggestive of a phylogenetic relation among their hosts. The host bat of *C. brevis brevis*, *M. tristis* spp. and *M. eschsoltzii*, may be closer to one another than to any other species of bats of the genus *Miniopterus*. This is distinctly contradictory to the knowledge gained from the general anatomy of the bats. For example, it is unusual for *M. tristis* spp. to be considered closer to *M. eschsoltzii* than to other members of the *tristis* group in the accepted taxonomic relationships. The acarological data given above may lead to new information regarding the taxonomy of the hosts.

***Calcarmyobia hamata hamata*** Uchikawa, Maeda, Harada & Kobayashi, 1980

*Calcarmyobia hamata* Uchikawa *et al.*, 1980, Contrib Biol. Labo. Kyoto Univ., **26**: 111.

*Calcarmyobia hamata* Uchikawa *et al.* is characterized by the structure of the genital shield, nature of  $d_1$  and  $d_2$ , unique form of modified claw on leg II and a spiniform seta dorsally on tibia II in the male (Figs 34, 35 and 36). The female is distinct in having a pair of scales dorso-laterally



on the opisthosoma. The mite was originally described from Bornean *Miniopterus schreibersi*, which has lately been reidentified by Maeda (1982) as *M. blepotis*.

Measurements in  $\mu\text{m}$  for holotype and 5 paratype males (Uchikawa *et al.*, 1980). Body 480 (490–500) long by 195 (195–210) wide. Seta *ve* 197 (200–210); *vi* 115 (113–123); *sc e* 173 (165–173); *sc i* 68 (70–74); *d*<sub>1</sub> 35 (35–40); *d*<sub>2</sub> 40 (32–38); *l*<sub>1</sub> 165 (145–167). Genital shield ? (48–53) long; *ga-ga* ? (36–38). Modified claw on leg II ? (43–45) long; modified seta on genu II ? (20–20).

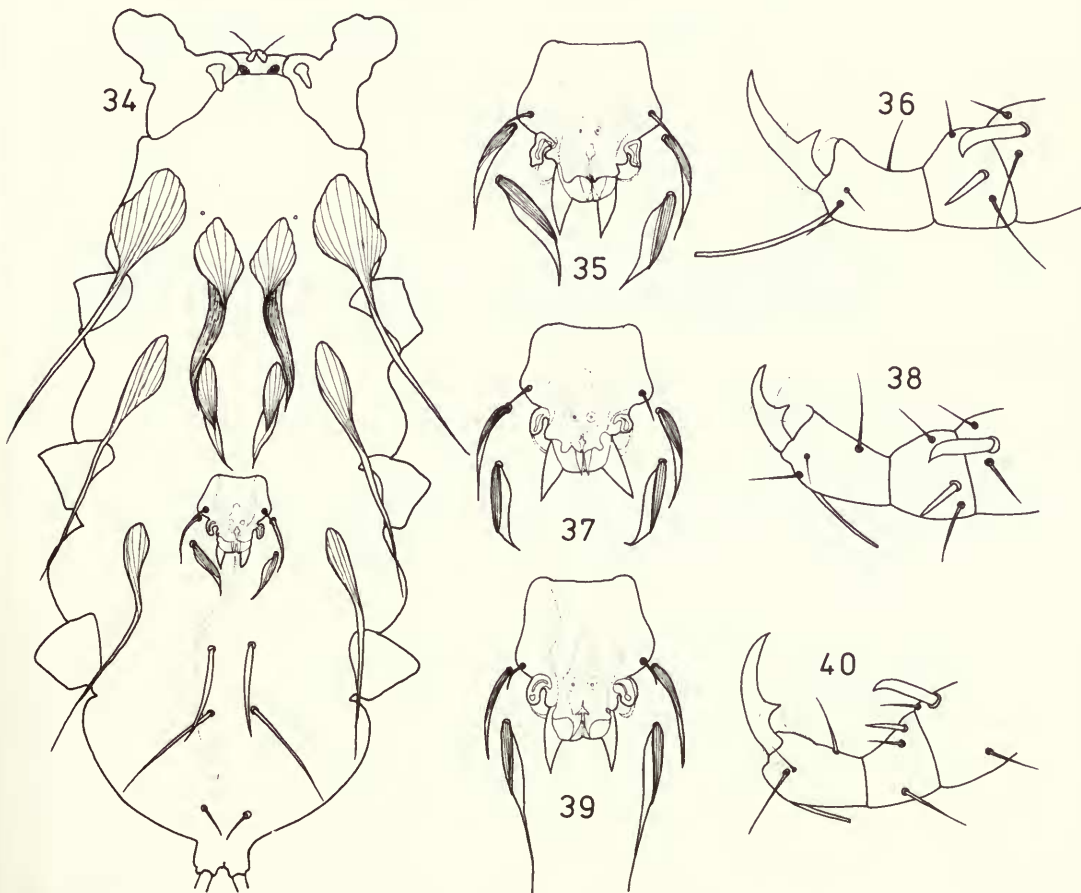
Measurements in  $\mu\text{m}$  for allotype and 4 paratype females (Uchikawa *et al.*, 1980). Body 585 (590–630) long by 270 (275–300) wide. Seta *sc e* 210 (200–208); *sc i* 115 (105–113); *d*<sub>1</sub> 58 (55–62); *d*<sub>2</sub> 70 (73–75); *d*<sub>3</sub> 100 (93–97); *d*<sub>4</sub> 95 (80–90); *d*<sub>5</sub> 81 (75–80); *l*<sub>1</sub> 204 (183–195); *l*<sub>2</sub> 90 (80–88); *d*<sub>1</sub>-*d*<sub>1</sub> 50 (50–53); *d*<sub>2</sub>-*d*<sub>2</sub> 25 (24–27); *d*<sub>3</sub>-*d*<sub>3</sub> ? (20–20); *l*<sub>2</sub>-*l*<sub>2</sub> ? (63–68).

*Calcarmyobia hamata breviungulae* nom. n.

*Calcarmyobia hamata* Uchikawa *et al.*, 1983, *Acarologia*, 24: 61.

MALE (Figs 37 & 38). Modified claw on leg II subequal in size and thickness to normal one; hook on modified claw small. Other structure, setation and setal nature as in nominate form.

Measurements in  $\mu\text{m}$  for holotype and 2 paratypes. Body 460 (465–450) long by 200 (205–200) wide. Setae *ve* 195 (200–195); *vi* 108 (115–115); *sc e* 158 (160–?); *sc i* 65 (65–63); *d*<sub>1</sub> 38 (33–35); *d*<sub>2</sub> 30 (33–31); *d*<sub>3</sub> 40



Figs 34–40 *Calcarmyobia hamata* ssp. *C. hamata hamata* Uchikawa *et al.*: paratype male (34); genital shield of male (35); leg II of male (36). *C. hamata breviungulae* ssp. n.: genital shield of male (37); leg II of male (38). *C. hamata longisetae* ssp. n.: genital shield of male (39); leg II of male (40).

(43–42);  $l_1$  145 (145–140);  $l_3$  63 (70–65). Genital shield 47 (43–43) long; *ga-ga* 35 (35–33). Modified claw on leg II 25 (27–27); modified seta on genu II 20 (21–20).

**FEMALE.** Hardly separable from nominate form.

Measurements in  $\mu\text{m}$  for allotype and 2 paratypes. Body 580 (550–560) long by 255 (250–250) wide. Seta *ve* 190 (183–?); *vi* 105 (100–95); *sc e* 200 (208–195); *sc i* 100 (107–98);  $d_1$  58 (55–50);  $d_2$  68 (68–68);  $d_3$  95 (88–85);  $d_4$  83 (83–?);  $l_1$  193 (195–190);  $l_3$  83 (80–80);  $d_1-d_1$  58 (50–50);  $d_2-d_2$  25 (25–23);  $d_3-d_3$  20 (18–18);  $l_2-l_2$  67 (60–60).

**MATERIAL EXAMINED.** Holotype male, allotype female, 2 pairs of paratype males and females ex *Miniopterus haradai*, Lampang Chae Mon, Tham Husi Lang, Thailand, date uncertain; 2♂♂ from the same host and locality, 25–VI–1969; 1♂1♀ ex *M. haradai*, Ban Rai, Uthaitani, Thailand, date uncertain.

The holotype and allotype will be deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo, and the other specimens in the collection of the author.

**REMARKS.** All the above specimens were recorded under the name *Calcaromyobia hamata* Uchikawa *et al.* in the previous paper (Uchikawa *et al.*, 1983). In the present study, the typical form of *C. hamata* was not found on any bat from the Oriental region, suggesting a limited distribution of the mite. Another form of *C. hamata* was further taken from the bats from West Java. According to the difference in the species and geographical ranges of the host bats of respective forms of the mites, such a minor but distinct deviation in the modified claw on leg II is regarded as being of a subspecific level.

The host bat of *C. hamata breviungulae* ssp. n. had long been named *Miniopterus medius* in Thailand (Hill & McNeely, 1975; Uchikawa *et al.*, 1983), but Maeda (1982) described it as a new species, *M. haradai*.

#### *Calcaromyobia hamata longisetae* ssp. n.

**MALE** (Figs 39 & 40). Seta  $d_2$  gradually tapering and long. Other properties essentially as in nominate form.

Measurements in  $\mu\text{m}$  for holotype and 3 paratypes. Body 450 (460–480) long by 200 (195–208) wide. Seta *ve* 190 (193–195); *vi* 118 (118–120); *sc e* 170 (160–168); *sc i* 65 (68–70);  $d_1$  31 (33–38);  $d_2$  60 (53–58);  $d_3$  40 (40–53);  $l_1$  158 (153–155);  $l_3$  66 (68–78). Genital shield 48 (45–48) long; *ga-ga* 32 (35–37). Modified claw on leg II 39 (35–50) long; modified seta on genu II 18 (18–20).

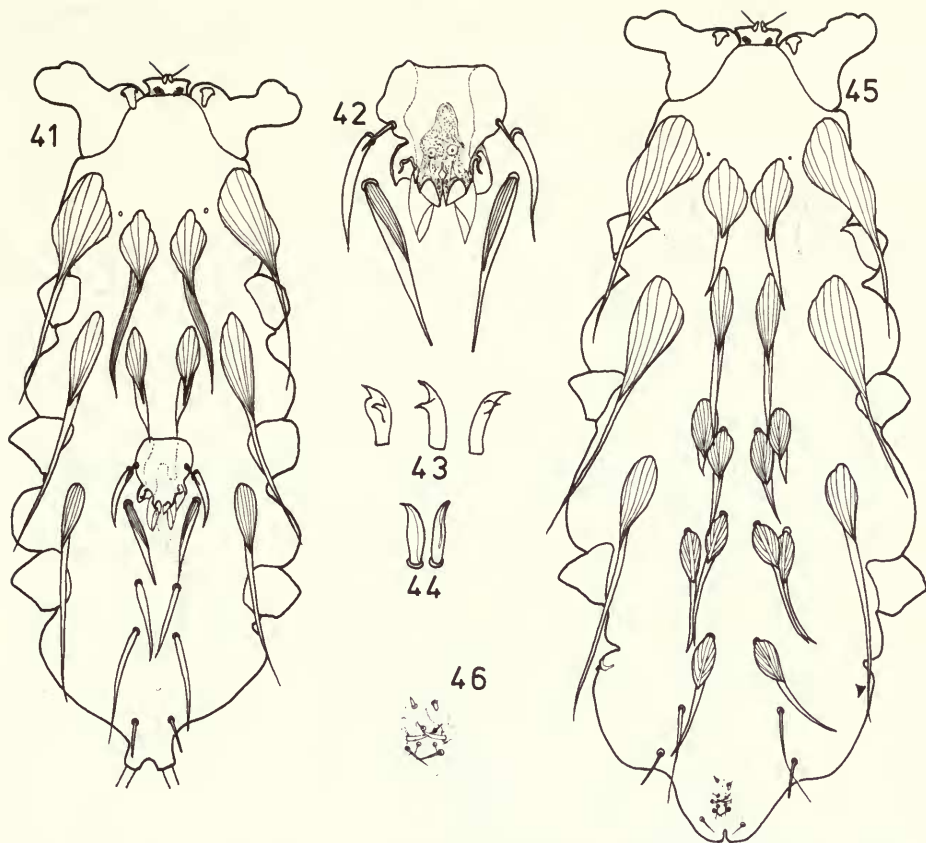
**FEMALE.** Seta  $d_1$  with minute tail, but hardly separable from nominate form.

Measurements in  $\mu\text{m}$  for allotype. Body 570 long. Seta *ve* more than 175; *vi* 102; *sc e* 198; *sc i* 112;  $d_1$  50;  $d_2$  80;  $d_3$  95;  $d_4$  88;  $l_1$  190;  $l_2$  90;  $d_1-d_1$  53;  $d_2-d_2$  23;  $d_3-d_3$  18;  $l_2-l_2$  63.

**MATERIAL EXAMINED.** Holotype male and allotype female ex *Miniopterus* sp., Cianjur, W. Java, 1970 (USNM 501673–87); 3 paratype males ex *Miniopterus* (labelled *schreibersi*), Campea, Bogor, W. Java, 21–VIII–1970 (USNM 501671); 1♂ (1984.6.12.116) together with *C. miniopteri* (Womersley (1♂) (1984.6.12.27) and *C. australasiae* Fain & Lukoschus (1♂1♀) (1984.6.12.126–127) ex *M. medius*, Kalipoetjang, Tjitandoei River, Java, 4–III–1908 (BMNH 9.1.5.462–3, 5–6).

**REMARKS.** *Calcaromyobia hamata longisetae* ssp. n. is distinctive in having the long and hooked modified claw on leg II and the seta  $d_2$  not terminated abruptly in the male.

The full range of host bat species cannot at present be determined because the series of bats that yielded the holotype and allotype is undetermined. Although the second series of host bats was labelled *M. schreibersi*, it is reasonable to presume that *M. schreibersi* is not distributed in the Oriental region (Uchikawa, 1985a). The specimen USMN 501671 seems to have been taken together with *Miniopterus* sp., the hosts of the holotype and allotype of the mite. The alcoholic specimens of the type series of *M. medius* in the collection of the BMNH (9.1.5.462–3, 5–6) harboured *C. miniopteri* and *C. australasiae* as well as *C. hamata longisetae*, confirming the post-mortem transfer of mites on museum bat specimens. These bats were originally constituents of the collection made by Shortridge in Java in 1908, which also included *M. paululus* (BMNH 9.1.5.426–7, –29–43), *M. australis minor* (type, BMNH 9.1.5.28) synonymized with *M. paululus* by Maeda (1982), *M. blepotis* (BMNH 9.1.5.444–59) and *M. macrodens* (BMNH 9.1.5.460–1). It



**Figs 41–46** *Calcarmyobia mollis* sp. n.: holotype male (41); genital shield of male (42); modified claw on leg II of male (43); modified seta on genu II of male (44); allotype female (45); genito-anal setae of female (46).

is not so difficult to postulate that all above *Miniopterus* had been lumped together in a container somewhere before being separated again in the BMNH. *C. miniopterus* and *C. australasiae* are known as specific parasites of *M. macrodens* and *M. paululus*, respectively (Uchikawa, 1982), and are thought to have been transferred from the true hosts to the above *M. medius*. Then, *M. medius* and /or *M. blepotis* must be the host or hosts of *C. hamata longisetae*. As the Bornean *M. blepotis* (det. Maeda) is the type host of *C. hamata hamata*, the Javanese *M. blepotis* may likewise be the true host of *C. hamata longisetae*. Similarly the Bornean *blepotis* is different from the *blepotis* from Java, the type locality of *M. blepotis*, and has its own subspecies of the mite. Although it is possible for *M. medius* and *M. blepotis* to share a mite, as seen in some examples of the different bats (Uchikawa, 1982), both the bats could have respective mites. A Malaysian bat labelled *M. medius* in the FMNH (64169–74) yielded a new mite of the same genus as described later. If its host is reconfirmed as being *M. medius*, the mite may be a true parasite of *M. medius*.

***Calcarmyobia mollis* sp. n.**

**MALE** (Figs 41, 42, 43 & 44). Slightly small sized species. Seta *vi* not inflated posteriorly. Structure of genital shield resembling those of *C. hamata* spp., but *gp* membranous. Setae *d*<sub>1</sub> and *d*<sub>2</sub> stout. Modified claw on leg II forked and subequal in size to normal one. Modified seta on genu II not so strong.



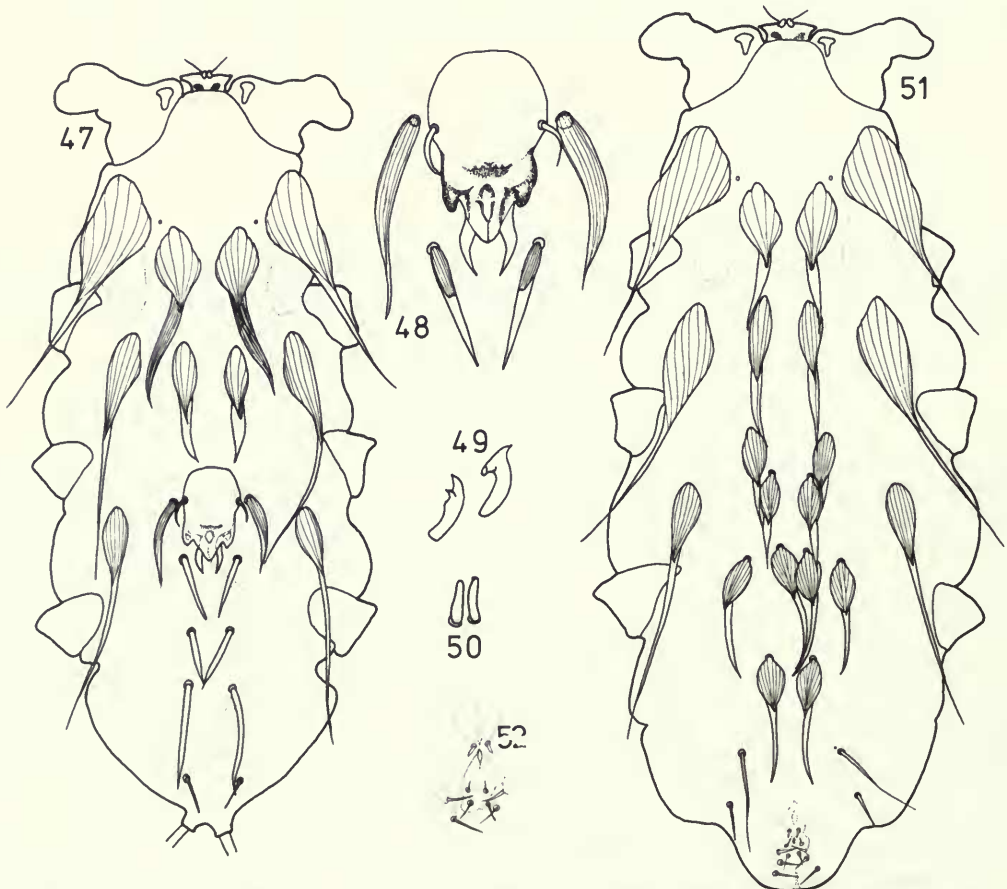
Measurements in  $\mu\text{m}$  for holotype and a paratype followed by those for 2 paratypes in parantheses. Body 420–415 (430–440) long by 180–175 (190–210) wide. Seta *ve* 141–145 (155–140); *vi* 117–118 (120–113); *sc e* 160–155 (165–138); *sc i* 70–68 (68–65); *d*<sub>1</sub> 40–40 (35–40); *d*<sub>2</sub> 55–50 (55–53); *d*<sub>3</sub> 45–43 (43–40); *l*<sub>1</sub> 140–145 (148–135); *l*<sub>2</sub> 68–65 (80–65). Genital shield 45–45 (43–47) long; *ga-ga* 33–30 (32–33). Modified seta on genu II 17–17 (15–18).

**FEMALE** (Figs 45 & 46). Seta *d*<sub>1</sub> with short tail; *d*<sub>1</sub> situated slightly anterior to basal level of *l*<sub>2</sub>. A pair of small scales dorso-laterally on opisthosoma. Anal seta *ai* clavete.

Measurements in  $\mu\text{m}$  for allotype and 2 paratypes. Body 550 (555–550) long by 235 (235–250) wide. Seta *ve* 157 (?–158); *vi* 110 (105–120); *d*<sub>1</sub> 53 (60–58); *d*<sub>2</sub> 73 (75–70); *d*<sub>3</sub> 98 (88–90); *d*<sub>4</sub> 83 (90–90); *l*<sub>1</sub> 185 (183–175); *l*<sub>2</sub> 83 (88–85); *d*<sub>1</sub>–*d*<sub>1</sub> 47 (50–55); *d*<sub>2</sub>–*d*<sub>2</sub> 25 (25–24); *d*<sub>3</sub>–*d*<sub>3</sub> 18 (15–20); *l*<sub>2</sub>–*l*<sub>2</sub> 65 (60–68).

**MATERIAL EXAMINED.** Holotype male, allotype female and a paratype male ex *Miniopterus* (labelled *medius*), Palopo, Wawondula, S. Sulawesi, IX–1972 (USNM 501664–9); 2♂1♀ ex *M. pusillus pusillus*, Lequi-Mai, E. Timor, 22/23-IV-1968 (AMNH 237834–61); 1♀ ex *Miniopterus* (labelled *australis*), Atsabe, E. Timor (AMNH 237828).

**REMARKS.** *Calcarmyobia mollis* sp. n. and *C. hamata* ssp. are very close to each other in having almost identical genital shields in the male. The former is, however, smaller than the latter, and bears a forked claw on leg II, while the corresponding claw is hooked in the latter.



**Figs 47–52** *Calcarmyobia mirabilis mirabilis* sp. n., ssp. n.: holotype male (47); genital shield of male (48); modified claw on leg II of male (49); modified seta on genu II of male (50); allotype female (51); genito-anal setae of female (51).



Although the host records of *C. mollis* are given above, complicated problems are inherent to the taxonomy of the bats judging from parasitological data obtained so far. The Thai bat formerly named *M. australis*, and revised as *M. pusillus* by Maeda (1982), is one of the hosts of *C. australasiae* Fain et Lukoschus (Uchikawa *et al.*, 1983), while the bat named *M. pusillus pusillus* from E. Timor yielded *C. mollis*. Thus, Maeda's definition of *M. pusillus* and that curated in the AMNH seems to be different from each other. Also *M. australis* is not the true host for the new species from Timor. Similar comments may be applied to *M. medius*.

*Calcarmyobia mirabilis mirabilis* sp. n., ssp. n.

MALE (Figs 47, 48, 49 & 50). Setae *vi* tapering;  $d_1$  situated at level of *ga*, distinctly stronger than  $d_2$ . Genital shield as in Fig. 48; *ga* stout; *gp* sharply pointed and pincer-like. Modified claw on leg II forked and smaller than normal one; modified seta on genu II small.

Measurements in  $\mu\text{m}$  for holotype and a paratype. Body 470–470 long by 200–200 wide. Seta *ve* 158–153; *vi* 107–110; *sc e* 153–150; *sc i* 72–69;  $d_1$  63–65;  $d_2$  40–43;  $d_3$  ?–48;  $l_1$  145–158;  $l_3$  65–78. Genital shield 63–63 long; *ga-ga* 33–33. Modified setae on genu II 12–13.

FEMALE (Figs 51 & 52). Hysterosomal submedian setae each with well developed striated part;  $d_3$  situated slightly anterior to or almost on basal level of  $l_2$ . Genital setae  $g_7$  slightly thicker than  $g_5$ ; *ai* weakly inflated.

Measurements in  $\mu\text{m}$  for allotype and a paratype. Body 590–565 long by 260–260 wide. Seta *ve* 160–163; *vi* 103–102; *sc e* 178–180; *sc i* 108–110;  $d_1$  63–65;  $d_2$  65–70;  $d_3$  88–75;  $d_4$  88–85;  $l_1$  190–175,  $l_2$  78–73;  $d_1-d_1$  48–50;  $d_2-d_2$  25–25;  $d_3-d_1$  20–18;  $l_2-l_2$  65–68.

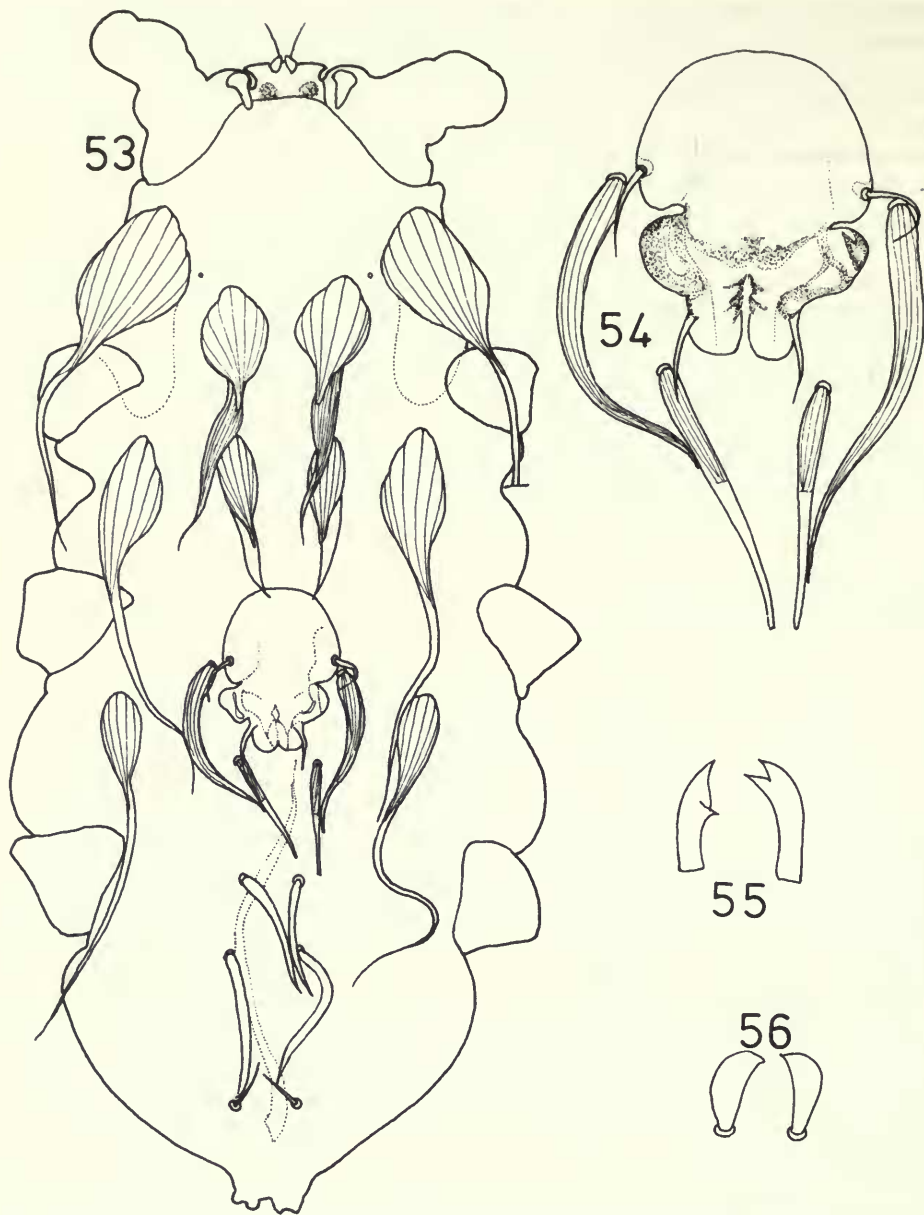
MATERIAL EXAMINED. Holotype male and allotype female ex *Miniopterus propitristis insularis*, New Guinea, Louisiades; Narian Misima Is., 8–XIII–1956 (AMNH 190479–82, 84–7); a pair of male and female paratypes from the same host, Terr. Papua: Kiriwina Is., 15–XII–1956 (AMNH 190733–6); 1♀ ex *M. propitristis propitristis*, Terr. Papua: Umi River, Markham River Valley, Morobe Dist., Papua New Guinea, 27–XI–1959 (AMNH 91401, Type); 1♂3♀♀ ex *M. propitristis*, Papua, West Division, Javareri, 10–II–1937 (AMNH 108507–16); ♀ ex *M. propitristis*, Terr. New Guinea: Kossam, Kratke Mts., 30–X–1959 (AMNH 191400); 2♂♂4♀♀ ex *M. propitristis*, Terr. New Guinea: Cape Vogel Peninsula, 16–IV–1953 (AMNH 157469); 3♂♂1♀ (1984.6.12.120–123) ex *Miniopterus*, 6 km inland from Wainoni Bay, San Christobal Is., Solomon (BMNH collector's number 316–7); 1♀ (1984.6.12.117) ex *M. tristis*, Espiritu Santo Is., New Hebrides (BMNH 36.4.8.3); 1♀ (1984.6.12.118) ex *M. tristis*, Hog Harbour, Espiritu Santo Is., New Hebrides (BMNH 73.1547–52); 1♂ (1984.6.12.119) ex *M. tristis*, Espiritu Santo Is., New Hebrides (BMNH 36.3.18.11).

REMARKS. The male of *C. mirabilis mirabilis* sp. n. is distinct in having the stout setae  $d_1$ , which are situated very close to *ga* and distinctly longer than  $d_2$ . The structure of the male genital shield is also quite different from those of the other known species in having small posterior lobes and forceps-like *gp*. Despite these remarkable specific characteristics in the male, the female is similar to those lacking opisthosomal scales. Thus it is virtually impossible to identify the mite, based only on female specimens.

The host bats of *C. mirabilis mirabilis* are *M. propitristis* ssp. and *Miniopterus* from the New Hebrides. *M. propitristis* was elevated to a full species in the *tristis* group (Peterson, 1981). *M. propitristis propitristis* and *M. propitristis insularis*, the hosts of *C. mirabilis*, are regarded as being different from *M. tristis* ssp. that harbour *C. brevis grandis* distinctly beyond the species level, thus supporting the treatment by Peterson (1981). *Miniopterus* from New Hebrides and the Solomon Islands are thought to be *M. propitristis* ssp., though some of them were identified as *tristis*.

*Calcarmyobia mirabilis exilisetae* ssp. n.

MALE (Figs 53, 54, 55 & 56). Genital shield with costal formation surrounded by a strong sclerite; width at level of costal formation almost the same as maximum width of shield slightly anterior to *ga*; posterior lobes broad and membranous; *gp* thin. Seta  $d_1$  slightly slenderer and longer than that of the nominate form. Modified seta on genu II inflated. Other morphological properties as in the nominate form.



Figs 53–56 *Calarmyobia mirabilis exilisetae* ssp. n.: holotype male (53); genital shield of male (54); modified claw on leg II (55); modified seta on genu II of male (56).

Measurements in  $\mu\text{m}$  for holotype and, in parentheses, for 2 paratypes. Body 450 (455–460) long by 210 (210–215) wide. Setae *ve* 148 (153–?); *vi* 110 (108–108); *sc e* 155 (150–160); *sc i* 67 (65–65); *d*<sub>1</sub> ca. 70 (70–68); *d*<sub>2</sub> 45 (55–47); *d*<sub>3</sub> 50 (48–50); *l*<sub>1</sub> 150 (140–?); *l*<sub>3</sub> ? (63–63). Genital shield 60 (62–62); *ga-ga* 38 (37–40). Modified seta on genu I 13 (13–13).

FEMALE. Unknown.

MATERIAL EXAMINED. Holotype male ex *Miniopterus*, Morobe Dist., Terr. New Guinea, 24–VII–1967 (BPSM 51234); 2 paratype males ex *Miniopterus* (labelled *tibialis*), Kaindi, Terr. New Guinea, 21–V–1959 (AMNH 191373–5, –7–80).

REMARKS. *Calcarmobia mirabilis exilisetae* ssp. n. is known only from the male. The genital shield is considerably different from that of the nominate form. The modified seta on genu II is inflated on all the specimens and quite different from that of the nominate form. The outline of the seta is, however, variable according to the state of mounted specimens.

The hosts of the mite, though it is recorded as *M. tibialis* above, are not determined, since *M. tibialis* is a probable host of *C. australasiae* as recorded below.

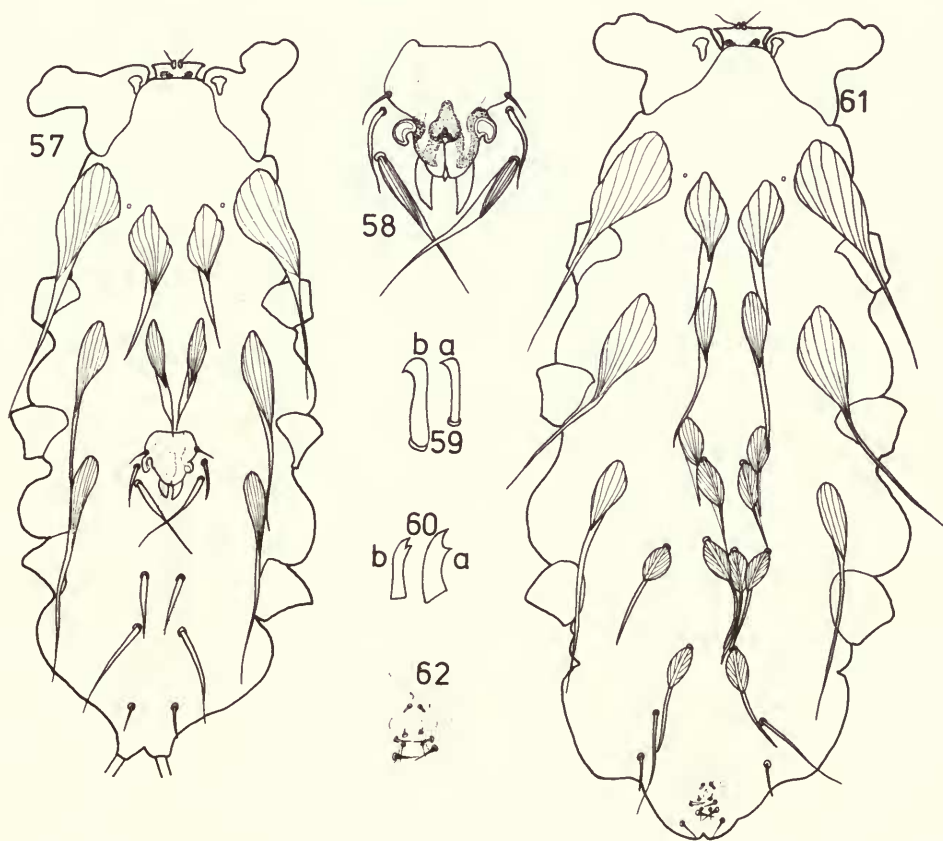
*Calcarmyobia isosetae* sp. n.

MALE (Figs 57, 58, 59 & 60). Small sized species. Seta *vi* the same in structure to that of the female. Genital shield similar to that of *C. australasiae*; *ga* fine; *gp* well developed. Seta *d*<sub>2</sub> fine posteriorly. Modified claw on leg II forked and stout; modified seta on genu II slender.

Measurements in  $\mu\text{m}$  for holotype. Body 430 long by 190 wide. Seta *ve* 155; *vi* 90; *sc e* ca. 130; *sc i* 70; *d*<sub>1</sub> ca. 28; *d*<sub>2</sub> 55; *d*<sub>3</sub> 40; *l*<sub>1</sub> ca. 150; *l*<sub>3</sub> 63. Genital shield 45 long; *ga-ga* 35. Modified seta on genu II 15.

FEMALE (Figs 61 & 62). Seta *d*<sub>1</sub> with striated base and tail of almost the same length; basal striated part of *d*<sub>2</sub>-*d*<sub>4</sub> and *l*<sub>2</sub> bulbous; *d*<sub>3</sub> closer to each other than to *l*<sub>2</sub>. Genital seta *g*<sub>5</sub> wider at base and more prominent than *g*<sub>7</sub>; *ai* swollen.

Measurements in  $\mu\text{m}$  for allotype. Body 550 long by 260 wide. Seta *ve* 173; *vi* 105; *sc e* 170; *sc i* 105; *d*<sub>1</sub> 65; *d*<sub>2</sub> 72; *d*<sub>3</sub> 80; *d*<sub>4</sub> 83; *l*<sub>1</sub> 178; *l*<sub>2</sub> 72; *d*<sub>1</sub>-*d*<sub>1</sub> 43; *d*<sub>2</sub>-*d*<sub>2</sub> 25; *d*<sub>3</sub>-*d*<sub>3</sub> 18; *l*<sub>2</sub>-*l*<sub>2</sub> 68.



Figs 57-62 *Calcarmyobia isosetae* sp. n.: holotype male (57); genital shield of male (58); modified seta on genu II of male (59a); modified claw on leg II of male (60a); allotype female (61); genito-anal setae of female (62). *Calcarmyobia australasiae* Fain & Lukoschus: modified seta on genu II (59b); modified claw of leg II of male (60b).

**Table 1** List of hosts and localities of the mites of the genus *Calcaromyobia* Radford from the Oriental and Australasian regions dealt with in the present paper

Mite species	BMNH Accession Number	Host species	Locality	Code No.	Host Accession Number
<i>C. orianae orianae</i> *		<i>M. orianae</i>	Darwin, Australia	42,68	USNM 284209-34
		<i>M. (orianae)</i>	Queensland, Australia	54	FMNH 60858
		<i>M. (blepotis)</i>	Queensland, Australia	57	FMNH 44245-7
		<i>M. (schreibersi)</i>	Misima Is., Papua	107	AMNH 190473-8
		<i>M. (tibialis)</i>	Morobe Dist., Papua	20	AMNH 195333-45
<i>C. orianae eminens</i> *	1984.6.12.114-115	<i>M. (magnater)</i>	Netherlands New Guinea	25	BSPM 21608
		<i>M. (magnater)</i>	Morobe Dist., Papua	184	BSPM 145400-3
		<i>M. (schreibersi)</i>	Ceylon	102	BMNH 13.2.10.34-7
<i>C. biloba</i> *		<i>M. macrocneme</i>	New Caledonia	1	BALM 1761,-63-6**
		<i>M. macrocneme</i>	New Caledonia	59	FMNH 55291-321
<i>C. brevis brevis</i> *		<i>M. (australis pusillus)</i>	India	60	SMF 47841
<i>C. brevis grandis</i> *		<i>M. tristis tristis</i>	Philippines	—	ROM 43655, 39860,-68
<i>C. brevis intermedia</i> *		<i>M. tristis cerebensis</i>	S. Sulawesi	15,51	AMNH 241557**.-8
		<i>M. eschscholtzii</i>	Philippines	55	FMNH 80384-431
		<i>M. eschscholtzii</i>	Philippines	82	USNM 17906
<i>C. hamata hamata</i>		<i>M. (blepotis)</i>	Sabah, Borneo	—	Uchikawa (1982)
<i>C. hamata breviungulae</i> *		<i>M. haradai</i>	Thailand	—	—
<i>C. hamata longisetae</i> *	1984.6.12.116	<i>Mintopterus</i> sp.	W. Java	86	USNM 501673-87
		<i>M. (schreibersi)</i>	W. Java	64	USNM 501671
		<i>M. (medius)</i>	S. Java	164	BMNH 9.1.5.462-3, 5-6
<i>C. mollis</i> *		<i>M. (medius)</i>	S. Sulawesi	63	USNM 501664-9
		<i>M. (pusillus pusillus)</i>	E. Timor	103	AMNH 237834-61
<i>C. mirabilis mirabilis</i> *		<i>M. (australis)</i>	E. Timor	104	AMNH 23728
		<i>M. propitristis insularis</i>	Misima Is., Papua	16	AMNH 190479-82, -84-7
		<i>M. propitristis insularis</i>	Kiriwina Is., Papua	17	AMNH 190733-6
		<i>M. propitristis propitristis</i>	Umi River, Papua	52	AMNH 91401**
		<i>M. propitristis</i>	W. Division, Papua	129	AMNH 10850-16
		<i>M. propitristis</i>	Kratke Mts., New Guinea	131	AMNH 191400
		<i>M. propitristis</i>	Terr. New Guinea	132	AMNH 157469
1984.6.12.117	<i>M. (tristis)</i>	Espiritu Santo Is., New Hebrides	124	BMNH 36.4.8.3	
1984.6.12.118	<i>M. (tristis)</i>	Espiritu Santo Is., New Hebrides	126	BMNH 73.1547-52	
1984.6.12.119	<i>M. (tristis)</i>	Espiritu Santo Is., New Hebrides	127	BMNH 36.3.18-11	
1984.6.12.120-123	<i>Miniopterus</i>	San Christobal Is., Solomon Is.	32	BMNH 316-7 (Col- lector's number)	
<i>C. mirabilis exilisetae</i> *		<i>Miniopterus</i>	Morobe Dist., Papua	2	BSPM 51234
		<i>M. (tibialis)</i>	Kaindi, Terr. New Guinea	126	AMNH 191373-5, -7-80
<i>C. isosetae</i> *		<i>M. (medius)</i>	Malaysia	52	FMNH 64169-74
<i>C. australasiae</i>		<i>M. (schreibersi)</i>	Misima Is., Papua	107	AMNH 190473-8
		<i>M. australis</i>	New Caledonia	154	BSPM 145549
		<i>M. tibialis</i>	Netherlands New Guinea	123	AMNH 152447-8
		<i>M. tibialis</i>	Kaindi, Terr. New Guinea	127	AMNH 191376
		<i>M. tibialis</i>	Lae, Terr. New Guinea	128	AMNH 191368-72
		<i>M. tibialis</i>	Papua	109	AMNH 158687-736
		<i>M. tibialis</i>	Queensland, Australia	21	AMNH 162684-701



Table 1 (Continued)

Mite species	BMNH Accession Number	Host species	Locality	Code No.	Host Accession Number
	1984.6.12.124	<i>M. tibialis</i>	Amboine	163	BMNH 7.1.1.557**
		<i>M. (macrocneme)</i>	New Georgia Is., Solomon Is.	58	FMNH 54808-42
		<i>M. (macrodens)</i>	Hong Kong	22	BSPM 65040
	1984.6.12.125	<i>M. (medius)</i>	Mountain Dist., New Guinea	77	BMNH 1938.8.3.34-6
	1984.6.12.126-127	<i>M. (medius)</i>	S. Java	164	BMNH 9.1.5.462-3, -5-6

\*New taxon of the mites. \*\*Type specimen(s) of the bats. Specific names of the host bats in parentheses are to be reconfirmed.

**MATERIAL EXAMINED.** Holotype male and allotype female ex *Miniopterus* (labelled *medius*), Malaysia (FMNH 64169-74).

**REMARKS.** All the males of the known species of the genus *Calcarmyobia* bear the seta *vi* quite different in form and nature from the homologous seta of their respective females. Thus, *Calcarmyobia isosetae* sp. n. is remarkable in having the seta essentially the same in both the sexes.

*C. isosetae* is allied to *C. australasiae* Fain & Lukoschus since both species have the male genital shields of almost the same structure. The genital seta *gp* is, however, stronger in *C. isosetae* than in *C. australasiae*. The modified seta on genu II and modified claw on leg II are also different in size in the two species as shown in Figs 59 and 60.

The females of *C. isosetae* and *C. australasiae* are barely separable from each other by the distance between the setae *d*<sub>1</sub>, that is 43 µm in the former and 65 µm in the latter.

The holotype male and allotype female were taken from bats labelled *M. medius* in the FMNH, suggesting a complicated status of the taxonomy of the bats so named. If the host bats are really *medius*, the present new species is its specific parasite that suggests a close affinity of the bat to *M. australis*. In passing, *Pteracarus faini* Uchikawa was also found from the same bat specimens. This mite is known to occur on *M. fuliginosus*, *M. australis*, *M. pusillus* (det. by Maeda) and others (Uchikawa, 1985b).

### *Calcarmyobia australasiae* Fain & Lukoschus, 1981

*Calcarmyobia australasiae* Fain & Lukoschus, 1981, *Bull. Ann. Soc. r. belge Ent.*, **116**: 46; Uchikawa, 1982, *Annot. zool. Japon.*, **55**: 35; Uchikawa *et al.*, 1983, *Acarologia*, **24**: 180. *Calcarmyobia miniopterus* (Womersley, 1941), Fain & Lukoschus, 1979, *Rec. West. Aust. Mus.*, **7**: 92.

*Calcarmyobia* sp., Uchikawa *et al.*, 1980, *Contr. biol. Lab. Kyoto Univ.*, **26**: 111.

**MATERIAL EXAMINED.** One ♀ ex *Miniopterus* (labelled *schreibersi*), Misima Is., Papua New Guinea, 8-XIII-1956 (AMNH 190473-8); 1♂ ex *M. australis*, New Caledonia, 30-III-1969 (BSPM 145549); 4♂♂1♀ ex *M. tibialis*, Netherlands New Guinea, 14-I-1939 (AMNH 152447-8); 1♂ 2♀♀ ex *M. tibialis*, Kaindi, Terr. New Guinea, 21-V-1959 (AMNH 191376); 3♂♂3♀♀ ex *M. tibialis*, Lae, Terr. New Guinea, 30-III-1959 (AMNH 191368-72); 3♂♂2♀♀ ex *M. tibialis*, Queensland, Australia, 15-II-1948 (AMNH 162684-701); 1♂ (1984.6.12.124) ex *M. tibialis*, Amboine (BMNH 7.1.1.557, Type); 2♀♀ ex *M. macrocneme*, New Georgia Is., Solomon Islands, 17-X-1943 (FMNH 54808-42); 1♂ ex *M. macrodens*, Hong Kong, 18-XIII-1964 (BSPM 65040); 1♂ (1984.6.12.125) ex *M. medius*, Mountain Dist., New Guinea (BMNH 1938.8.3.34-6); 1♂1♀ (1984.6.12.126-127) ex *M. medius*, Kalipoetjang, Tjitandoei River, S. Java, 4-IV-1908 (BMNH 9.1.5.462-3, -5-6).

**REMARKS.** The type host of *C. australasiae* Fain et Lukoschus is *M. australis* from Western Australia. A male was found on the type of *M. tibialis* (BMNH 7.1.1.557) in the present study.

A list of the hosts and localities of all the mites dealt with in the present paper is given in Table 1. The host species in parentheses are to be re-examined further taxonomically.

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